

ABSTRACT

An electrical characteristic in an operator-sensing circuit having a microcontroller that commands a charge-transfer sensor to send a sensor charge signal to a capacitive sensing electrode.

The sensor receives a discharge signal from the electrode and outputs a corresponding raw data signal to the microcontroller that in turn sends a signal that disables the motor of a unit of power equipment upon the absence of an operator's hand on a hand-gripping surface of the equipment.

Capacitive means for operating within a predetermined output capacitor discharge range that includes preselected binary digit values that designate hands-off and hands-on conditions on the hand-gripping surface. The capacitor discharge range is effective to distinguish between the

presence of an operator's hand and foreign material on the gripping surface for avoiding a false hands-on signal. The capacitive means includes an operator-hand sensing electrode having an inner dielectric material layer contiguously disposed on a metal handle portion of the power equipment, a metal conductor material layer contiguously disposed on the dielectric material, and an outer

dielectric hand-grip material having a hand-gripping surface. So when the operator's hand grasps the outer hand-grip material disposed around the metal conductor material layer the capacitance is

increased and the sensing electrode produces a smaller discharge signal to indicate a hands-on condition on the hand-gripping surface. The capacitor discharge range includes a hands-off section in which foreign materials such as water, dirt, and mud add capacitance to the hand-gripping surface that may produce a false hands-on condition, and a true hands-on section in which the operator's

hand is grasping the hand-gripping surface and provides an accurate capacitor discharge digit value that allows the power equipment continued operation.